

Permitting of CNG/LNG Facilities



Clean Vehicle Education Foundation

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CNG Codes, Standards & Regulations

- Always use the current editions of Codes and Standards
 - Many States and other jurisdictions fail to update their requirements when C&S are updated, sometimes for decades
 - NFPA 52-2013 Vehicular Gaseous Fuel Systems Code in particular is frequently revised to address critical safety issues.
 - Critical issues in recent updates include:
 - Written maintenance procedures and records are required
 - Dispenser measuring systems and safety relief valves must be verified
 - A dispenser fault requires shutdown and repair before return to service
 - A HAZOPS is required before significant station changes and must be provided to the AHJ on request.

Operating Practices

- Make the permit conditional on carrying out the required maintenance and verifications
- Require that existing station maintenance, calibration and dispenser fault response be upgraded to the latest NFPA 52
- Consider placarding dispensers to alert drivers to the need to verify the operation of their CNG cylinder valves, especially in the spring
- Update other dispenser labeling to the latest version of NFPA 52
- Provide for an approved defueling facility at each maintenance facility where the fuel vehicle fuel storage system is serviced.

Critical CNG Dispenser Issues

- Accurate and reliable dispensing is essential to NGV safety
- CVEF has identified dispenser malfunctions found both before and after a serious safety incident
- Tampering has been an issue
- Undetected component failure leading to single point failure has been an issue
- There is no up-to-date standard for verifying the performance of dispensing systems
- NFPA 52 does not require listing of dispensers but 30a requires listing if installed at a liquid fuel station
- “Listing” of some dispensers may only apply to the electrical components and not to the fill control functions that are critical to vehicle safety
- Approval of the dispenser system is an important part of permitting

CNG Dispenser Approval

- Provision of comprehensive maintenance, calibration and verification procedures
- Use of sensor redundancy with failure detection and fault notification
- Shut down on fault detection
- Provide only for 3,600 psi dispensing
 - Older, lower pressure cylinders have reached their end of life
 - Multiple service pressures are implicated in several high-severity incidents
- Use of reliable and verifiable control valves
- Use of an ASME Code pressure relief valve with a set pressure no higher than 4,500 psi.
- Robust controls against unauthorized adjustment or tampering
- Empirical test certification that the control algorithms satisfy the maximum fill limits over a range of cylinder types, ambient temperatures and starting fuel levels.
 - Absolute maximum pressure of 4,500 psi for 3,600 psi vehicles in hot fills.
 - Accurate temperature compensation at lower temperatures to prevent the pressure in a full cylinder from exceeding 3,600 psi at 70F.

Require Engineered Indoor Facilities

- Make use of two relatively new CVEF documents on the technology tab at www.Cleanvehicle.org
- *Guideline for Determining the Modifications Required for Adding Compressed Natural Gas and Liquefied Natural Gas Vehicles To Existing Maintenance Facilities*
 - A comprehensive view of relevant C&S as well as important insights
 - Should provide guidance to avoid over or under engineering
- *Analyses in Support of Risk-Informed Natural Gas Vehicle Maintenance Facility Codes and Standards: Phase I*
 - Results indicate that facilities meeting C&S for conventional fuel vehicles may need minimal modifications to handle credible NG leaks and PRV discharges
 - Results also indicate that current code requirements may not provide sufficient protection against unintended activation of a vehicle PRD
 - Growing use of rupture discs and underrated global CNG components is a serious safety concern. Facilities may wish to consider defueling vehicles with rupture discs before bringing them inside.
 - See *Improper Use of Underrated European CNG Valves and Rupture Disc PRDs on US Vehicles* at www.Cleanvehicle.org